

1/24

2

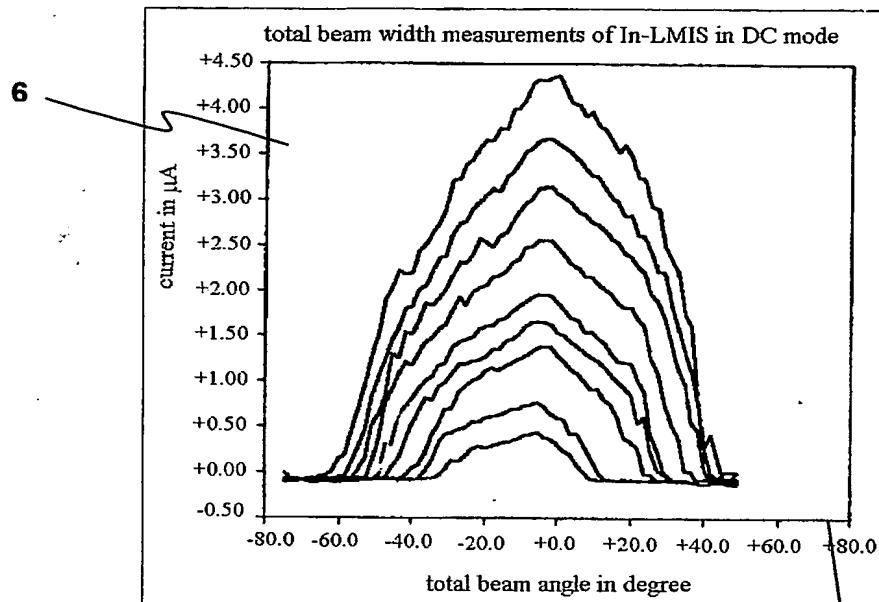


FIG.1

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2/24

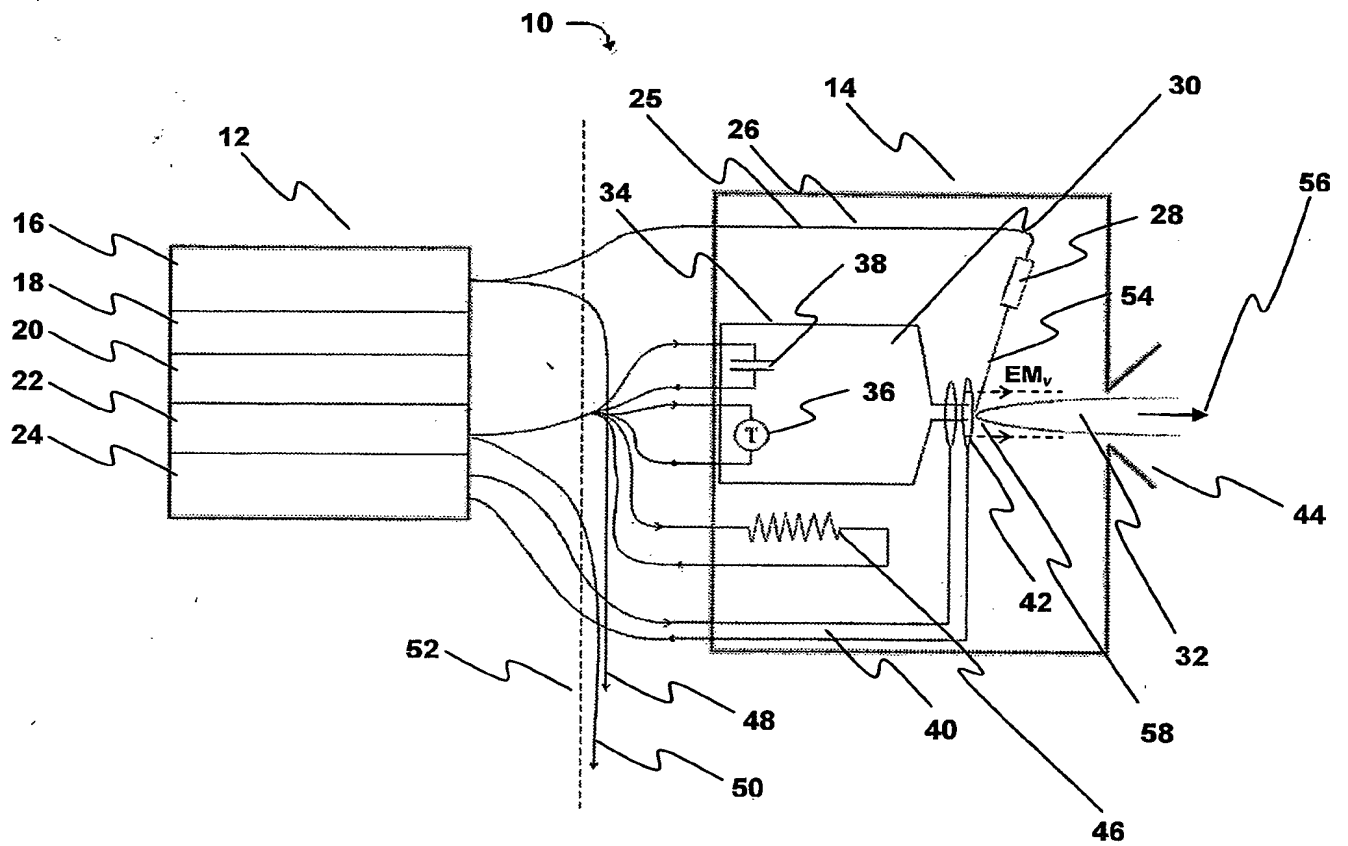


FIG. 2

3/24

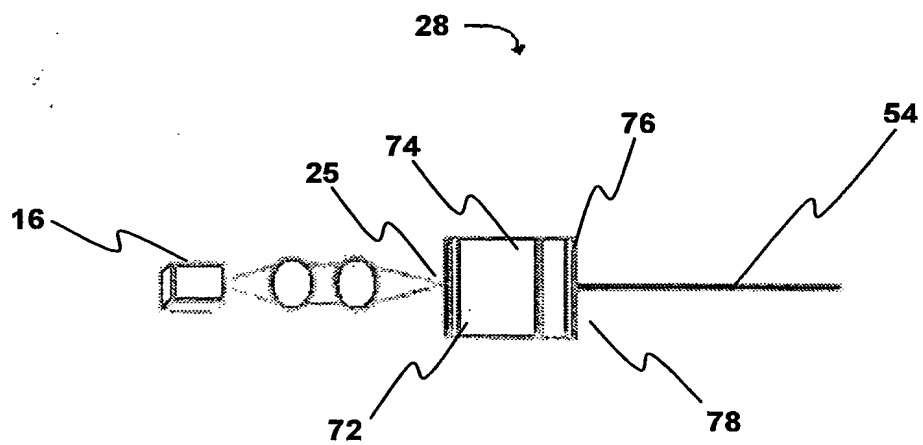


FIG. 3

4/24

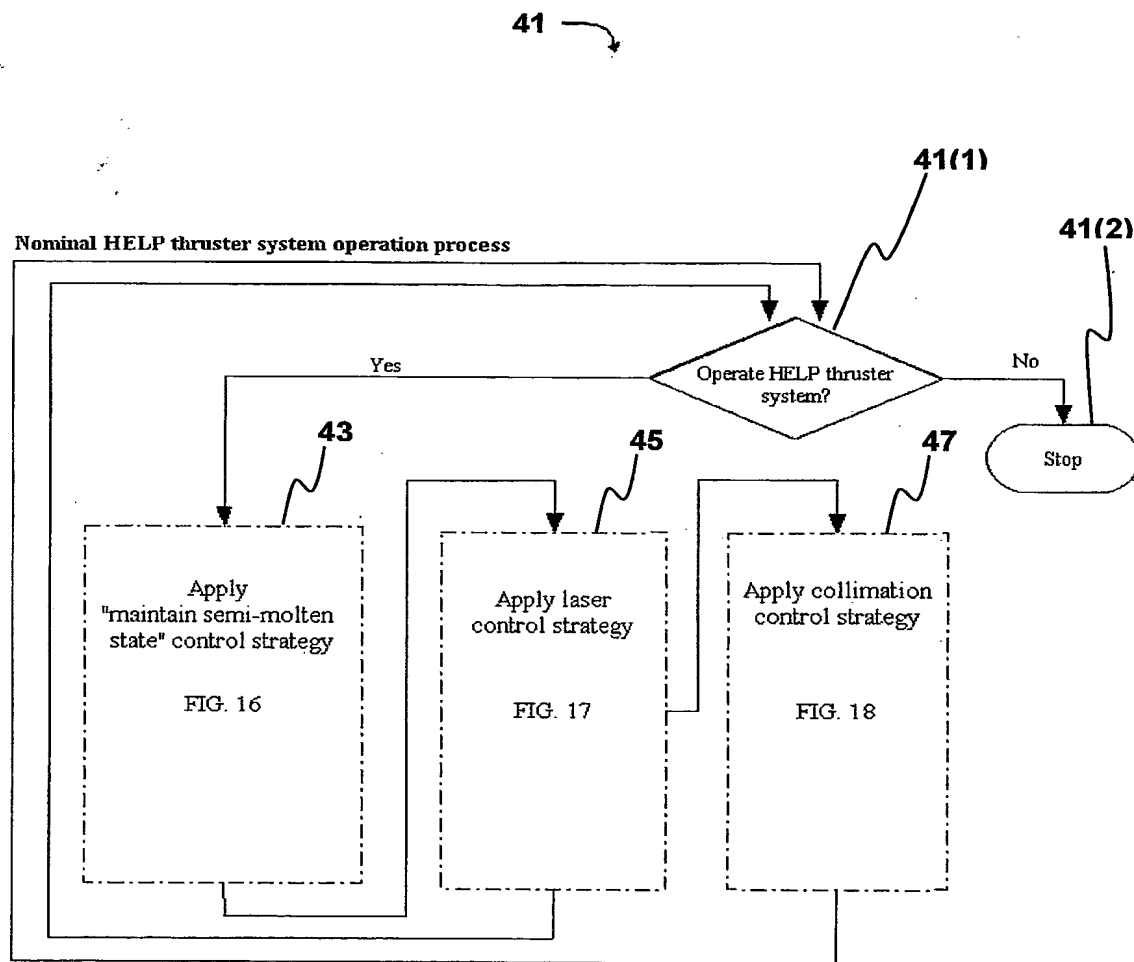


FIG. 4

5/24

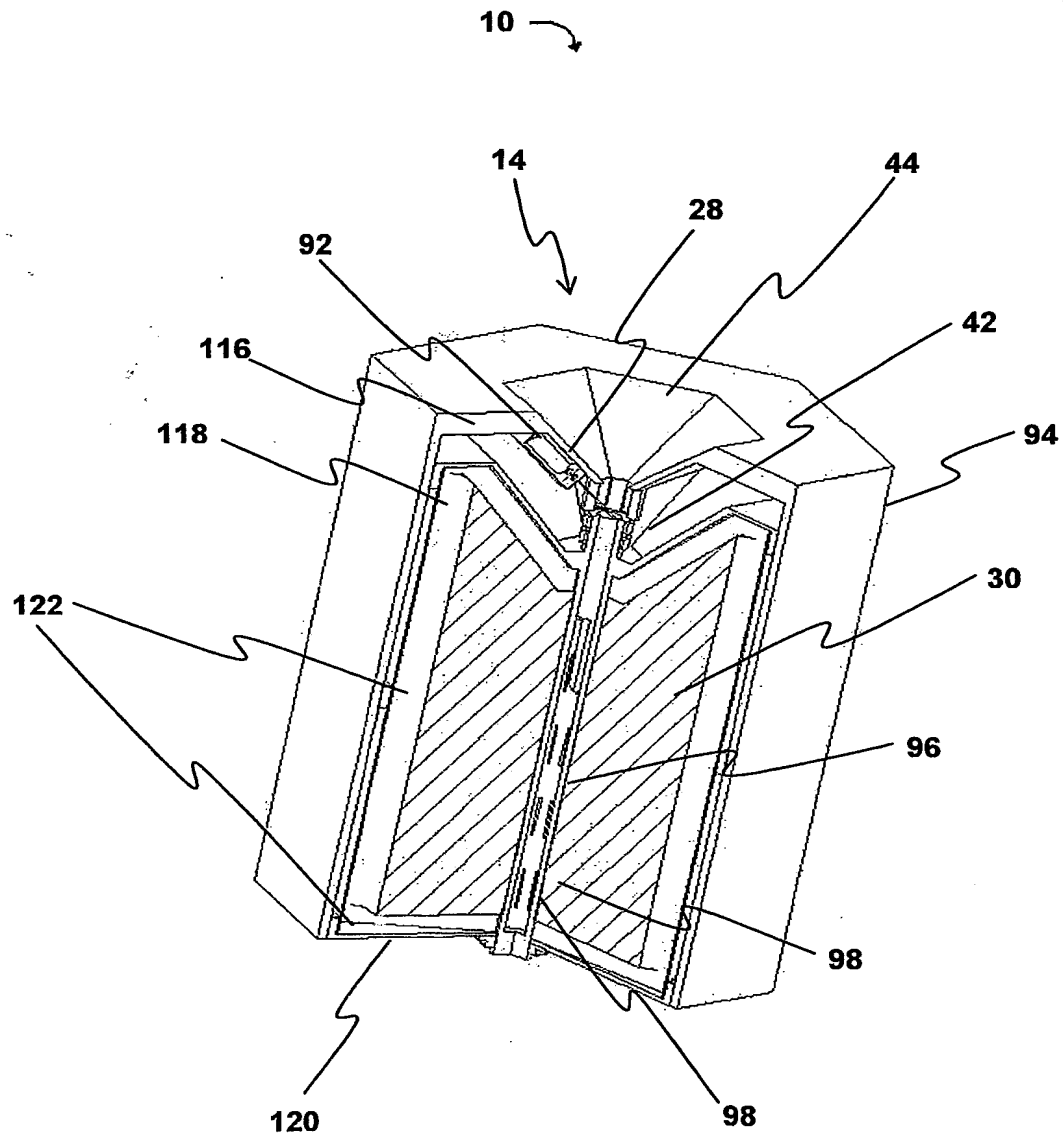


FIG. 5

6/24

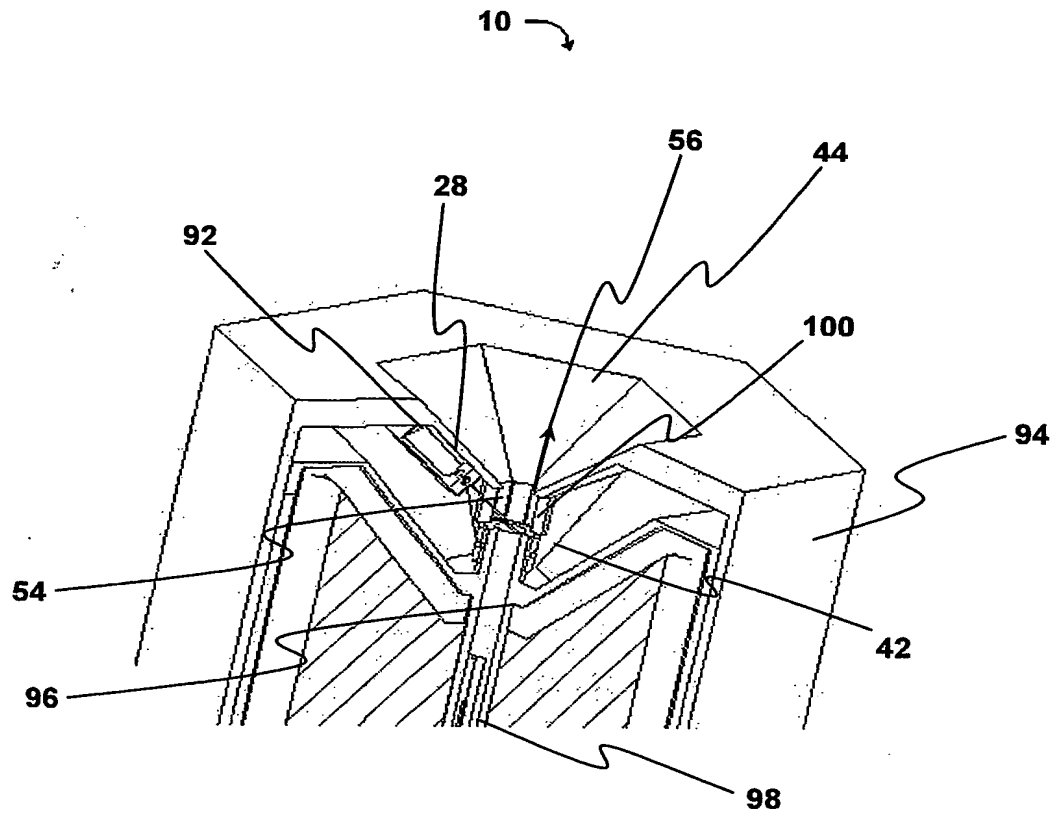


FIG. 6

7/24

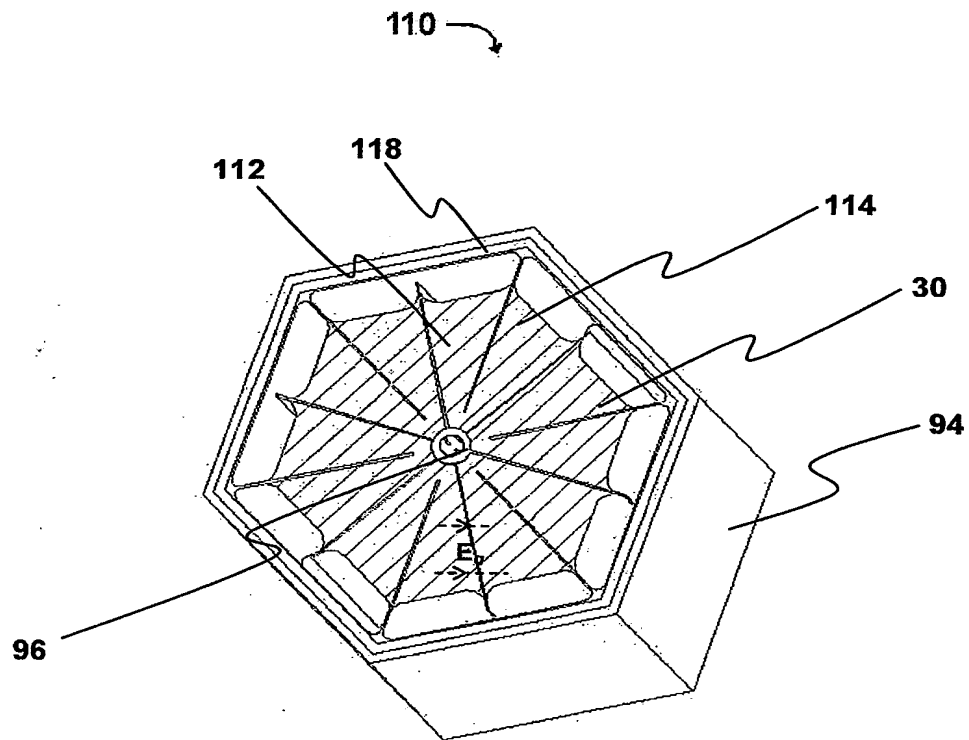


FIG. 7

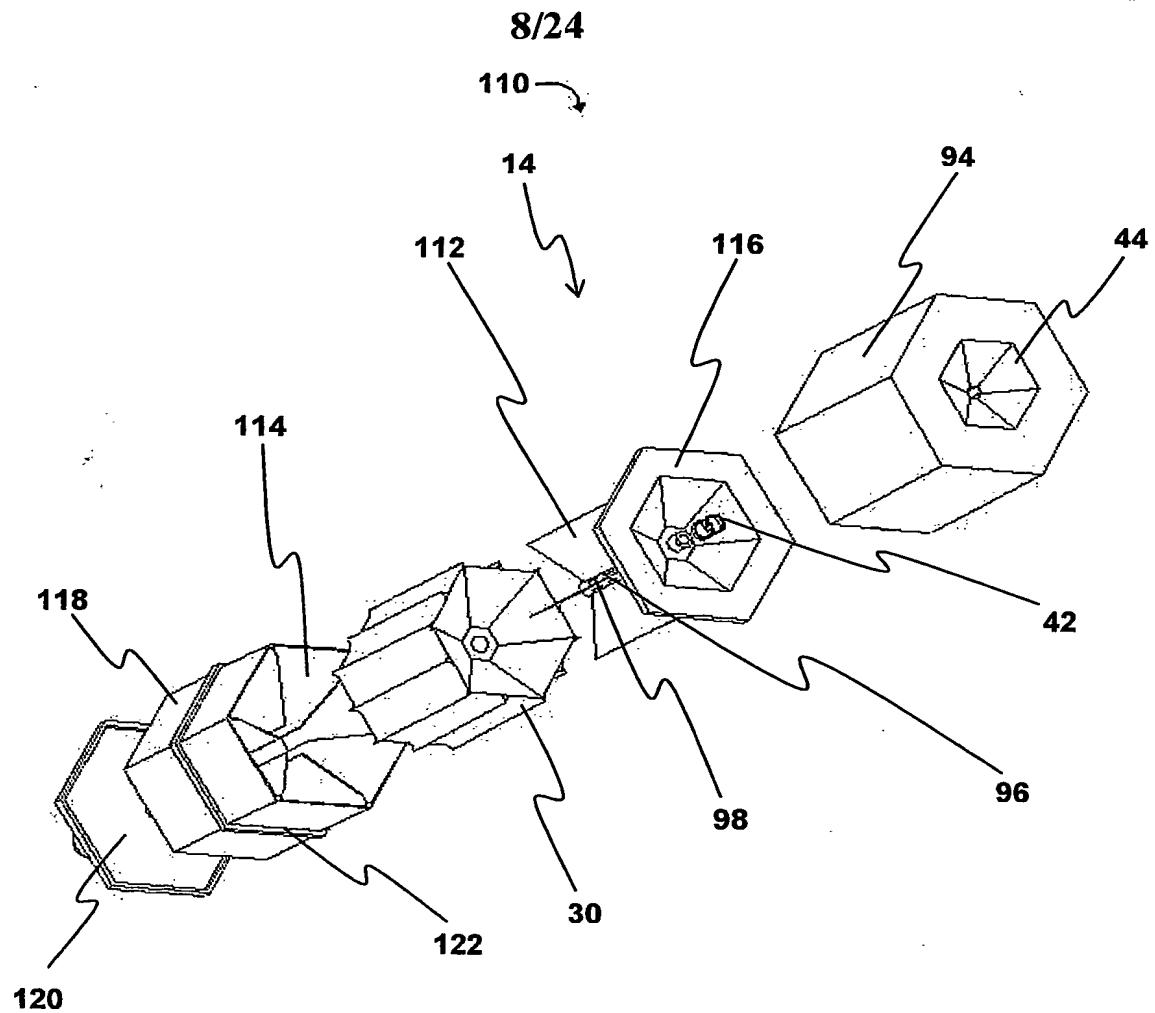


FIG. 8

9/24

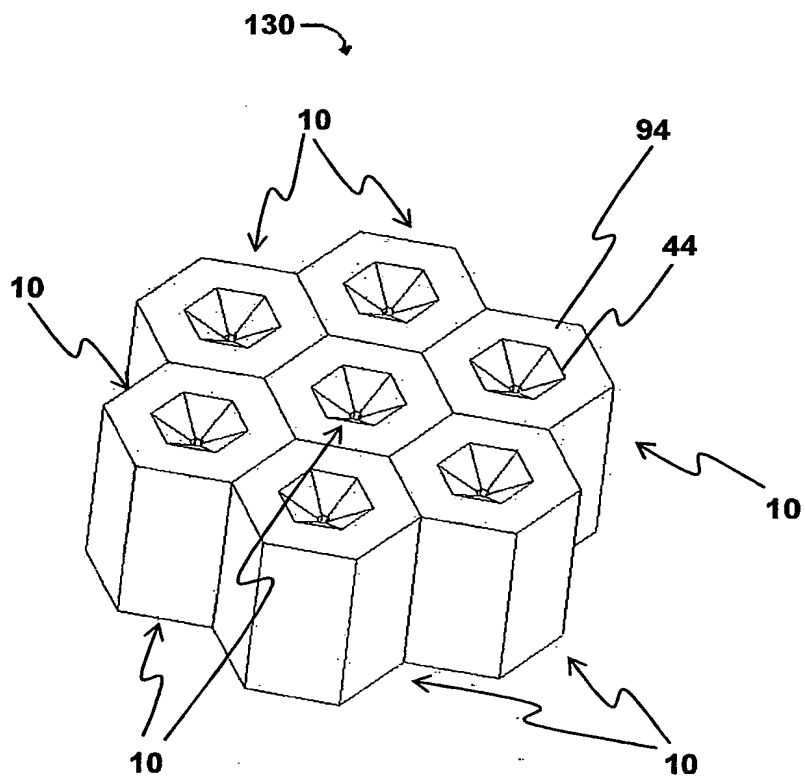


FIG. 9

10/24

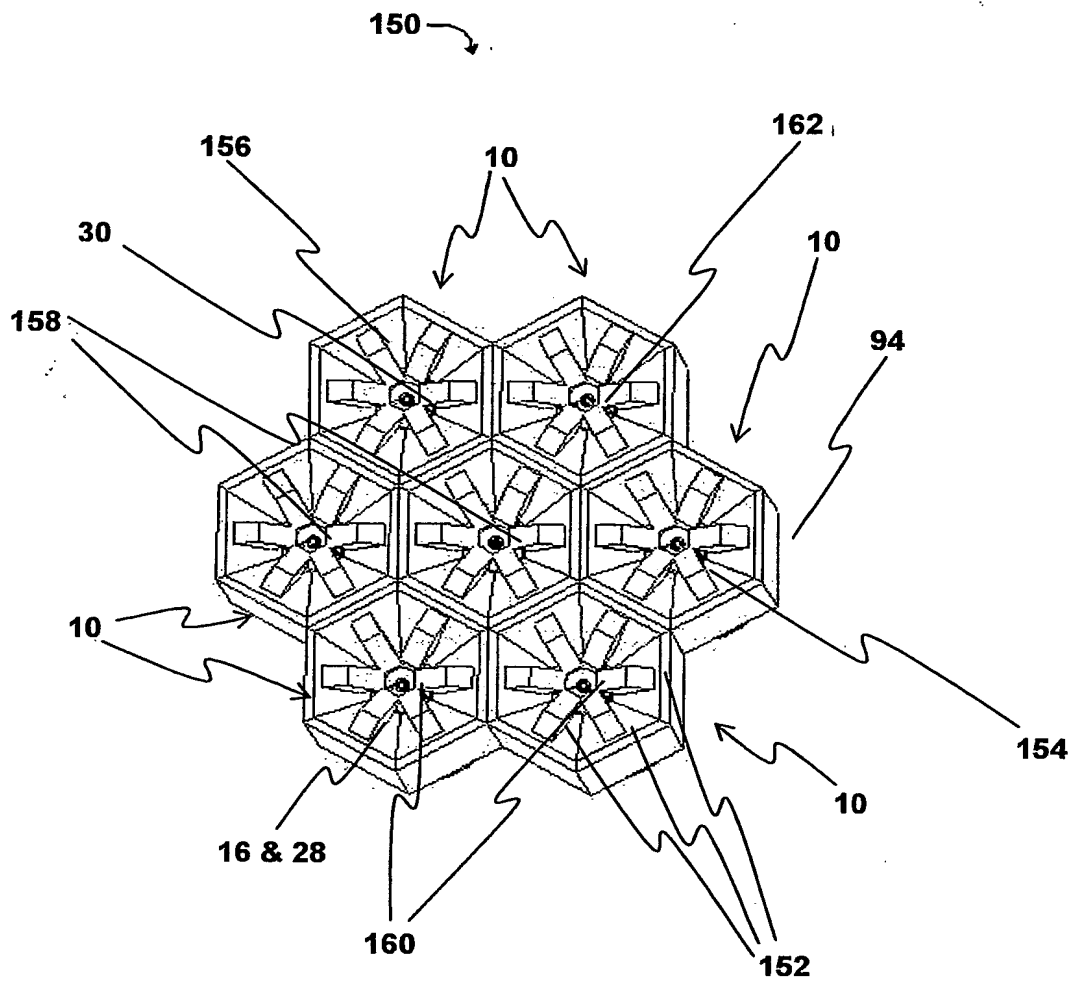


FIG. 10

11/24

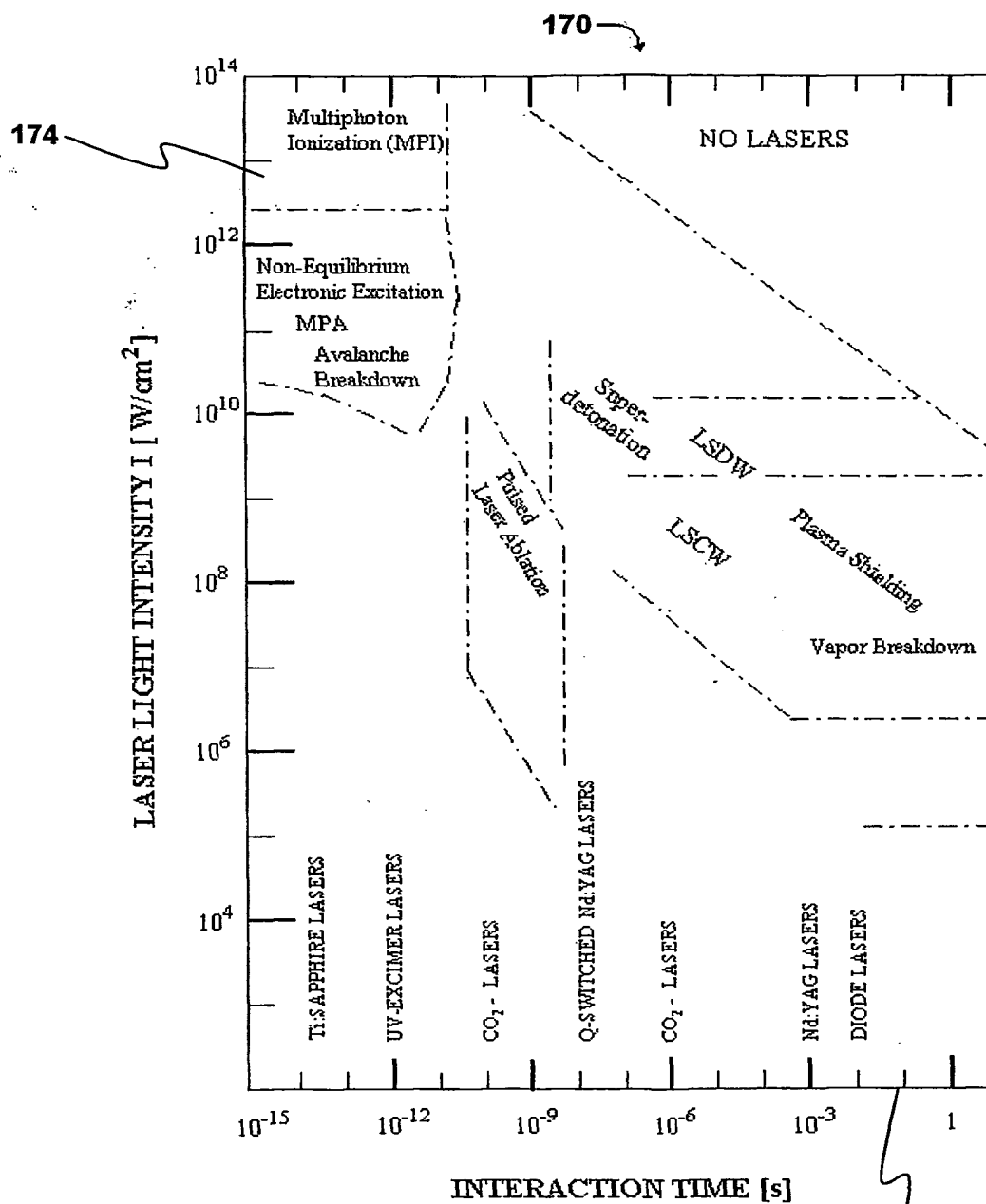


FIG. 11

12/24

190

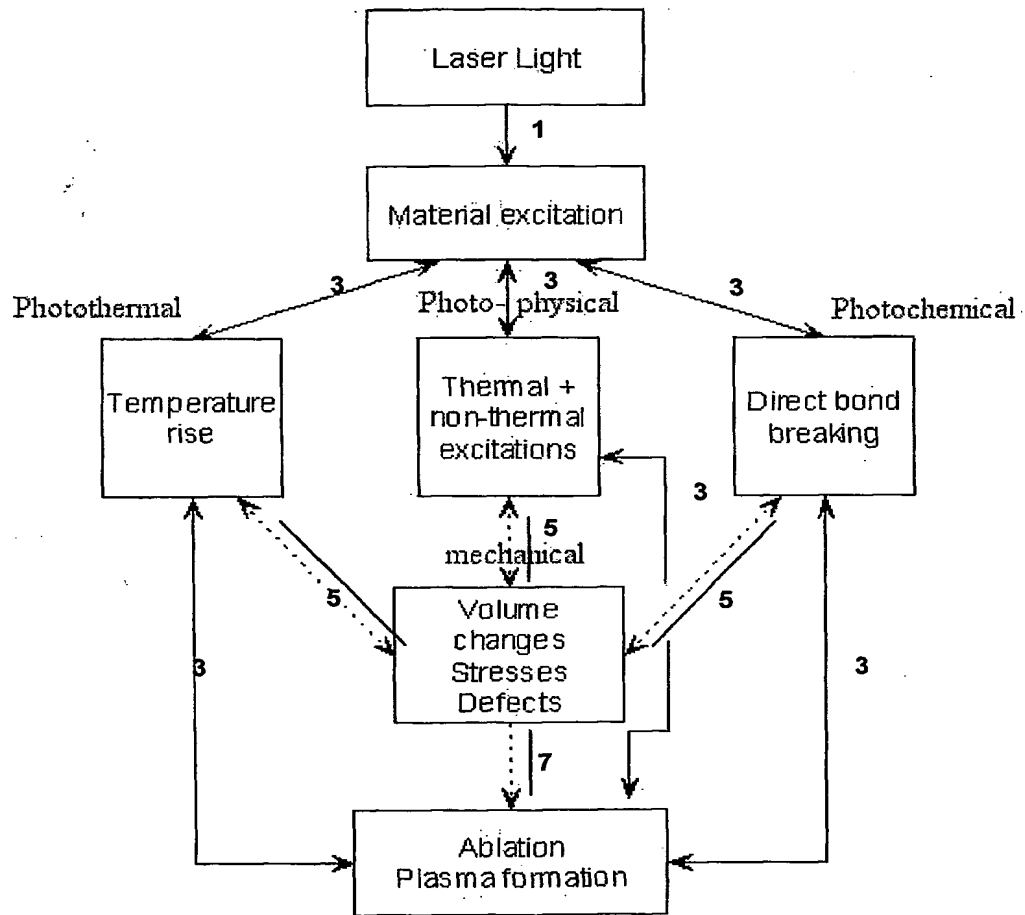


FIG. 12

13/24

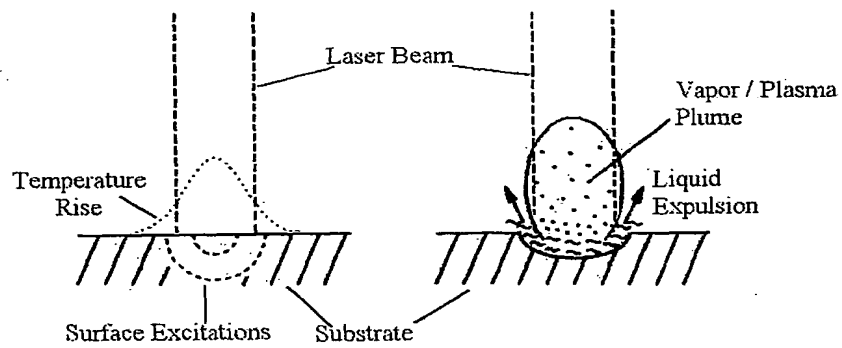


FIG. 13

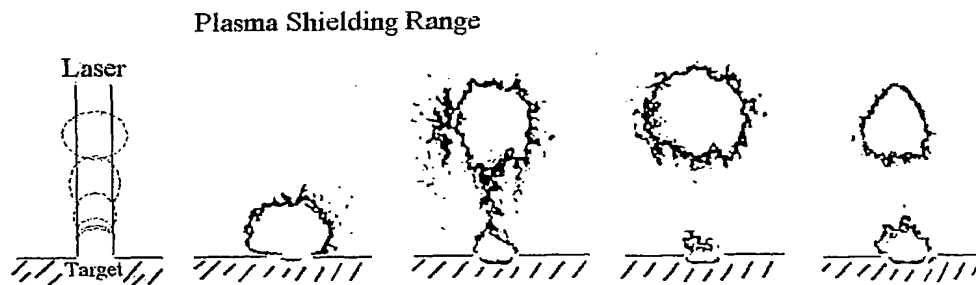


FIG. 14

14/24

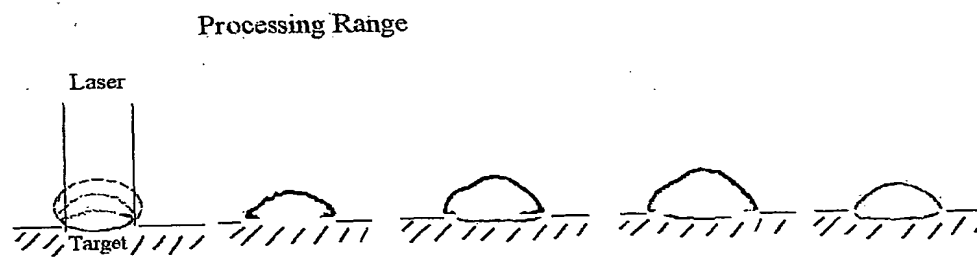


FIG. 15

15/24

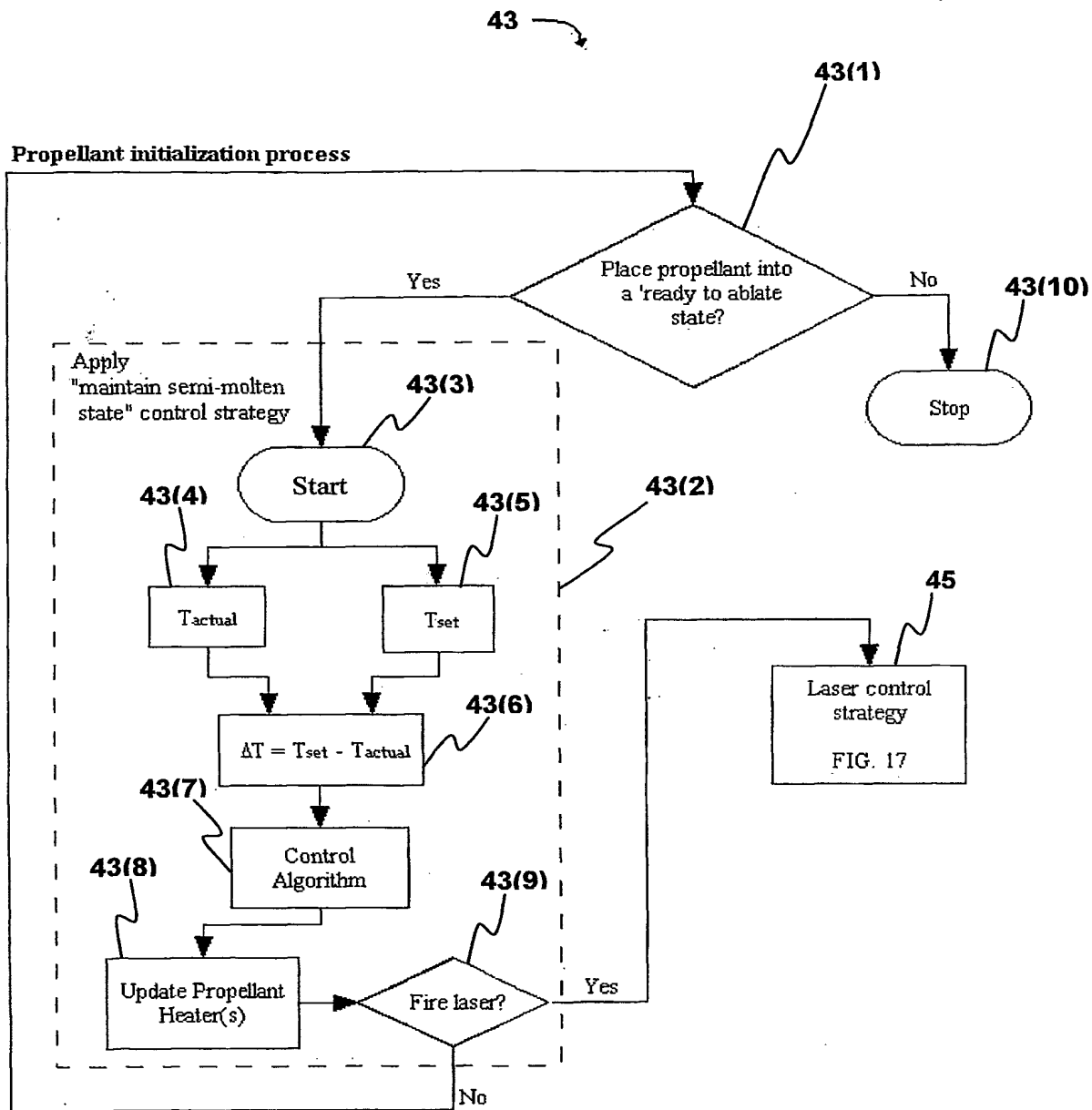


FIG. 16

16/24

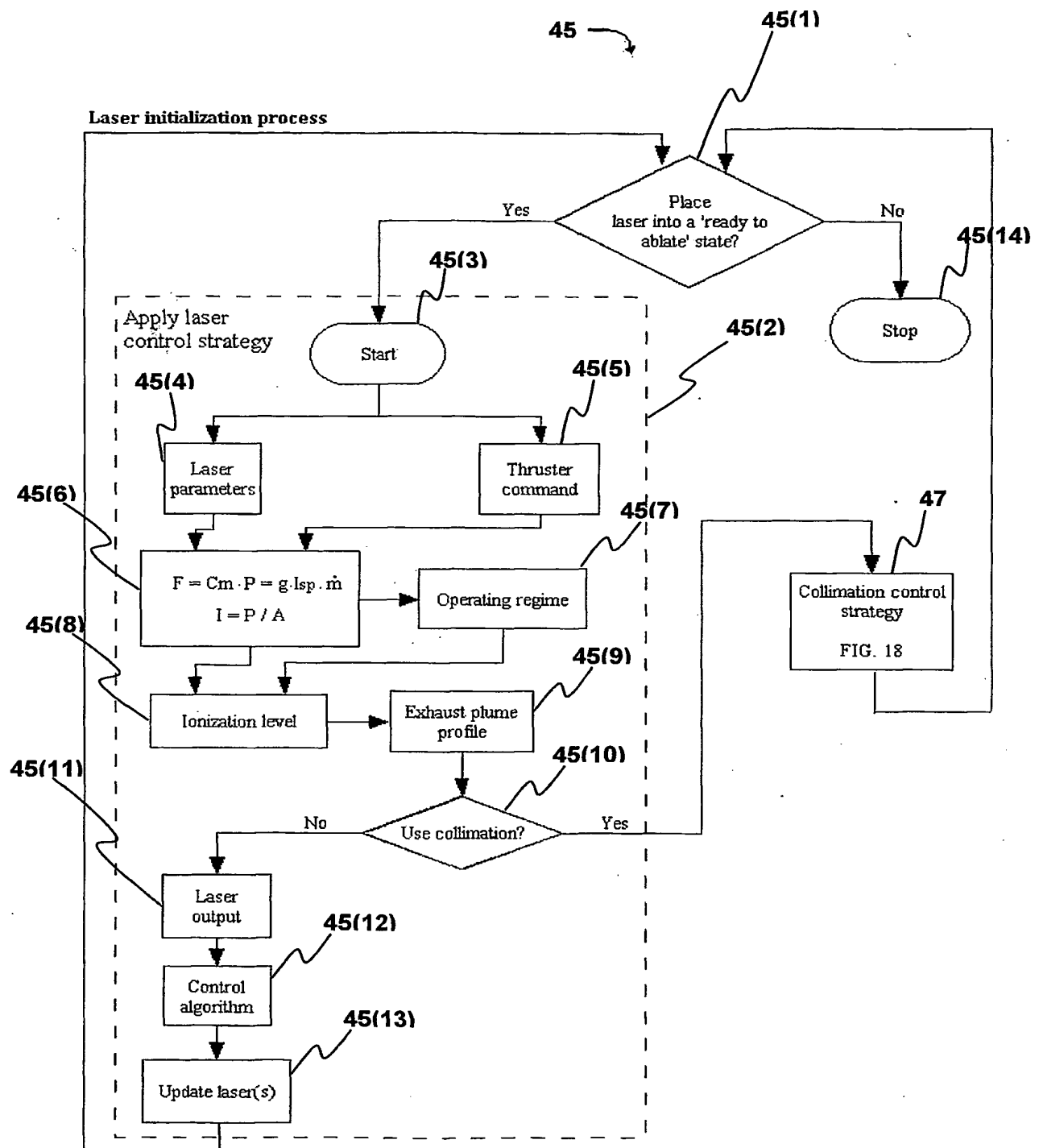


FIG. 17

17/24

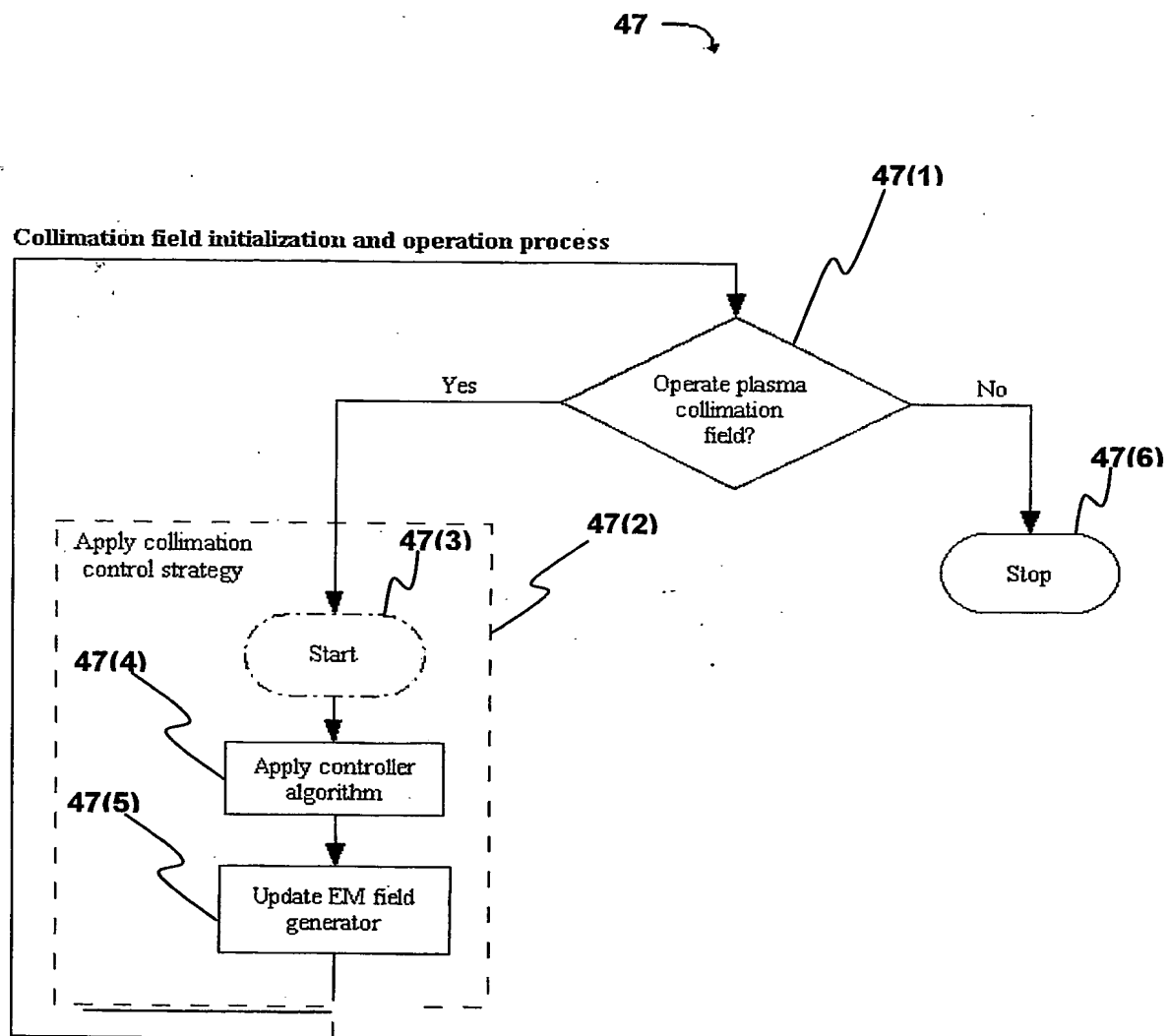


FIG. 18

18/24

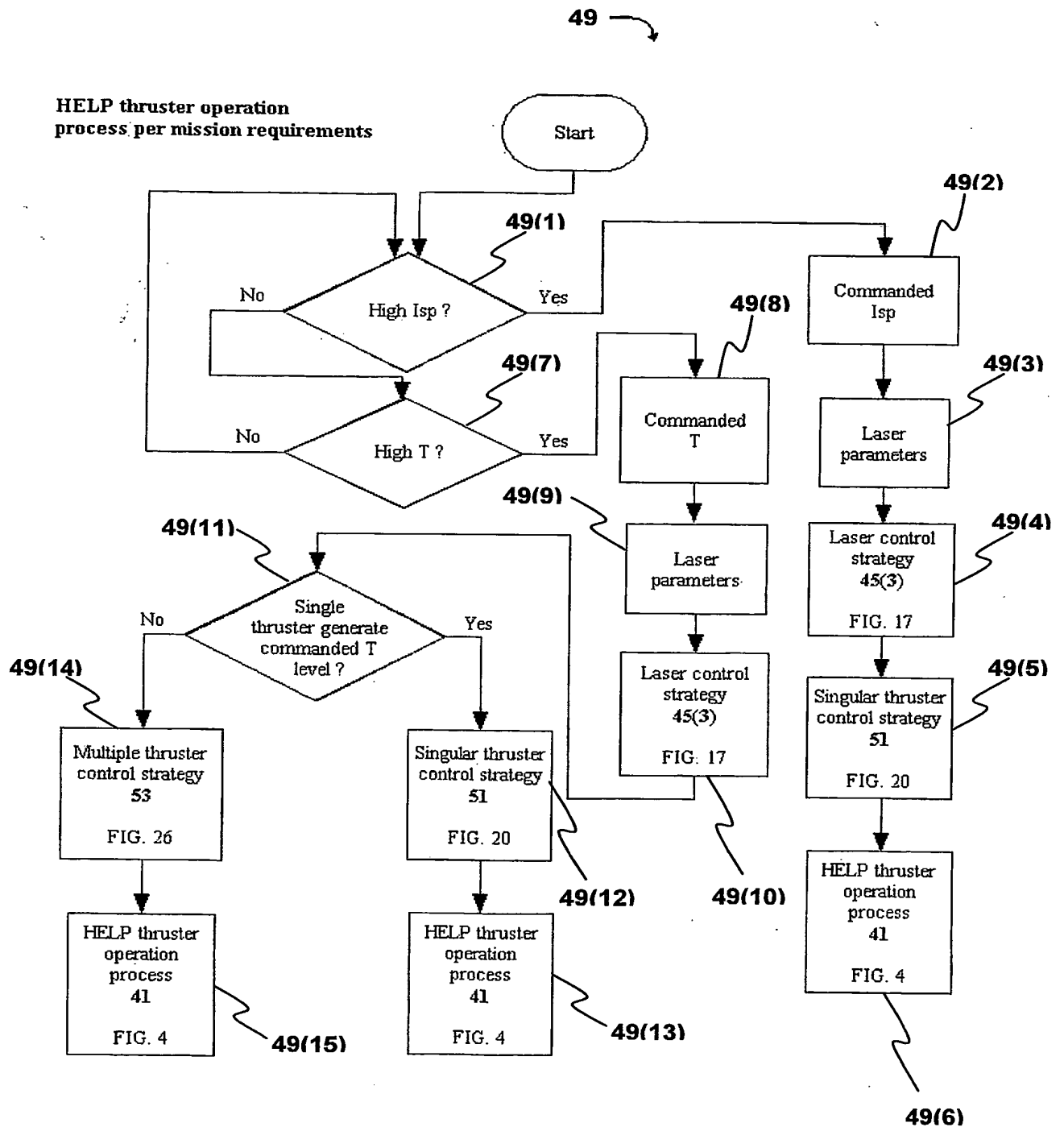
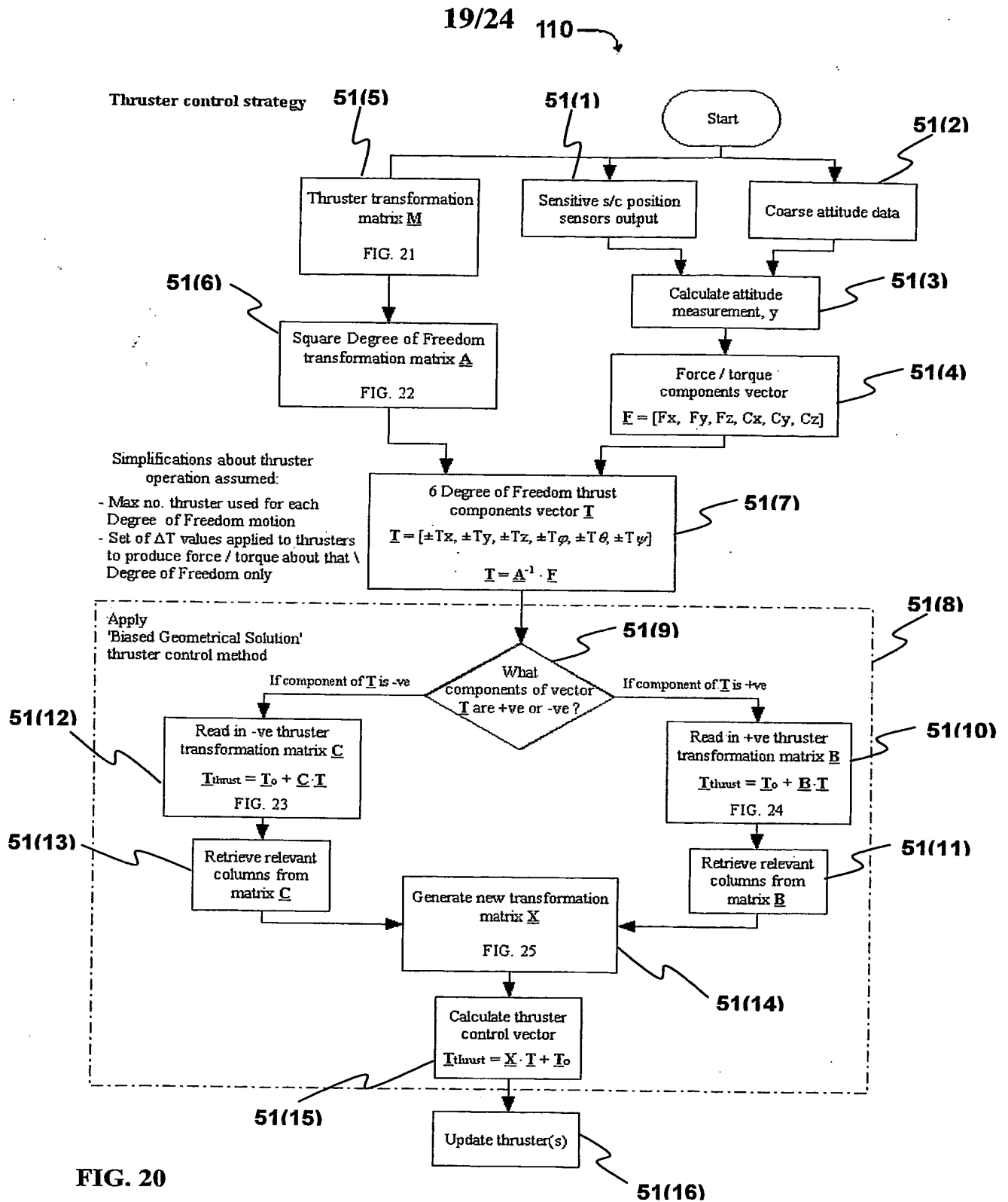


FIG. 19



20/24

$\underline{F} =$		\underline{M}										\underline{T}_{thrust}	
\underline{F}		\underline{M}										\underline{T}_{thrust}	
F_x	$\cos 70^\circ$	$\cos 70^\circ$	$\cos 70^\circ$	$\cos 70^\circ$	$\cos 70^\circ$	$\cos 70^\circ$	$\cos 70^\circ$	$\cos 70^\circ$	$\cos 70^\circ$	$\cos 70^\circ$	$\cos 70^\circ$	$\cos 20^\circ$	T_1
F_y	0	$\cos 20^\circ$	$\cos 30^\circ$	$\cos 70^\circ$	$\cos 30^\circ$	$\cos 70^\circ$	$\cos 30^\circ$	$\cos 70^\circ$	$\cos 30^\circ$	$\cos 70^\circ$	$\cos 30^\circ$	$\cos 30^\circ$	T_2
F_z	$\cos 20^\circ$	$\cos 20^\circ$	$\cos 20^\circ$	$\cos 20^\circ$	$\cos 20^\circ$	$\cos 20^\circ$	$\cos 20^\circ$	$\cos 20^\circ$	$\cos 20^\circ$	$\cos 20^\circ$	$\cos 20^\circ$	$\cos 20^\circ$	T_3
C_ϕ	0	0	0	$\cos 20^\circ$	$\cos 60^\circ$	$\cos 20^\circ$	$\cos 60^\circ$	$\cos 20^\circ$	$\cos 60^\circ$	$\cos 20^\circ$	$\cos 60^\circ$	$\cos 60^\circ$	T_4
C_θ	$-\cos 20^\circ$	$\cos 20^\circ$	$\cos 20^\circ$	$\cos 20^\circ$	$\cos 20^\circ$	$\cos 20^\circ$	$\cos 20^\circ$	$\cos 20^\circ$	$\cos 20^\circ$	$\cos 20^\circ$	$\cos 20^\circ$	$\cos 20^\circ$	T_5
C_ψ	0	$\cos 20^\circ$	$\cos 20^\circ$	$\cos 20^\circ$	$\cos 20^\circ$	$\cos 20^\circ$	$\cos 20^\circ$	$\cos 20^\circ$	$\cos 20^\circ$	$\cos 20^\circ$	$\cos 20^\circ$	$\cos 20^\circ$	T_6
													T_7
													T_8
													T_9
													T_{10}
													T_{11}
													T_{12}

Where

F = Force
 C = Torque
 T = Thrust

FIG. 21

21/24

$$\underline{\mathbf{F}} = \underline{\mathbf{A}} * \underline{\mathbf{T}}$$

$\underline{\mathbf{F}}$	$\underline{\mathbf{A}}$						$\underline{\mathbf{T}}$
F_x	$(3\cos 70^\circ + 2\cos 20^\circ * \cos 30^\circ)$	0	0	0	0	0	T_x
F_y	0	$(3\cos 70^\circ + 2\cos 20^\circ * \cos 30^\circ)$	0	0	0	0	T_y
F_z	0	0	$(4\cos 20^\circ)$	0	0	0	T_z
C_ϕ	0	0	0	$(2\cos 20^\circ * D + 2\cos 20^\circ * \cos 60^\circ * D)$	0	0	T_ϕ
C_θ	0	0	0	0	$(2\cos 20^\circ * D + 2\cos 20^\circ * \cos 60^\circ * D)$	0	T_θ
C_ψ	0	0	0	0	0	$(4\cos 20^\circ * \cos 60^\circ * D)$	T_ψ

FIG. 22

$$\underline{\mathbf{T}}_{\text{thrust}} = \underline{\mathbf{C}} * \underline{\mathbf{T}} + \underline{\mathbf{T}}_0$$

$\underline{\mathbf{T}}_{\text{thrust}}$	$\underline{\mathbf{C}}$						$\underline{\mathbf{T}}$	Bias thrust $\underline{\mathbf{T}}_0$
	X	y	z	ϕ	θ	ψ		$\underline{\mathbf{T}}_0$
T1	0	0.5	0	0	2	1	$-T_x$	1
T2	0	0	1	0.5	0	0	$-T_y$	1
T3	0	1	1	0.5	0	1	$-T_z$	1
T4	0.5	1	0	2	0	0	$-T_\phi$	1
T5	0	1	1	0	0.5	0	$-T_\theta$	1
T6	1	1	1	0	0.5	1	$-T_\psi$	+
T7	1	0.5	0	0	0	1		1
T8	1	1	1	0.5	1	0		1
T9	1	0	1	0.5	1	1		1
T10	0.5	0	0	0	0	0		1
T11	1	0	1	1	0.5	0		1
T12	0	0	1	1	0.5	1		1

FIG. 23

22/24

$$\underline{T}_{\text{thrust}} = \underline{B} * \underline{T} + \underline{T}_o$$

<u>T</u> _{thrust}	<u>B</u>						<u>T</u>	Bias thrust <u>T</u> _o
	x	y	z	φ	θ	ψ		<u>T</u> _o
T ₁	1	0.5	1	0	0	1	T _x	1
T ₂	1	1	0	0.5	1	1	T _y	1
T ₃	1	0	0	0.5	1	0	T _z	1
T ₄	0.5	0	1	0	0	0	T _φ	1
T ₅	1	0	0	1	0.5	1	T _θ	1
T ₆	0	0	0	0.5	0.5	0	T _ψ	+
T ₇	0	0.5	1	0	2	1		1
T ₈	0	0	0	0.5	0	1		1
T ₉	0	1	0	0.5	0	0		1
T ₁₀	0.5	1	1	2	0	0		1
T ₁₁	0	1	0	0	0.5	1		1
T ₁₂	1	1	0	0	0.5	0		1

FIG. 24

$$\underline{T}_{\text{thrust}} = \underline{X} * \underline{T} + \underline{T}_o$$

<u>T</u> _{thrust}	<u>X</u>						<u>T</u>	Bias thrust <u>T</u> _o
	x	y	z	φ	θ	ψ		<u>T</u> _o
T ₁	0	0	0	0	0	0	-T _x	1
T ₂	0	0	0	0	0	0	-T _y	1
T ₃	0	0	0	0	0	0	-T _z	1
T ₄	0.5	0	0	0	0	0	-T _φ	1
T ₅	0	0	0	0	0	0	-T _θ	1
T ₆	1	0	0	0	0	0	-T _ψ	+
T ₇	1	0	0	0	0	0		1
T ₈	1	0	0	0	0	0		1
T ₉	1	0	0	0	0	0		1
T ₁₀	0.5	0	0	0	0	0		1
T ₁₁	1	0	0	0	0	0		1
T ₁₂	0	0	0	0	0	0		1

FIG. 25

23/24

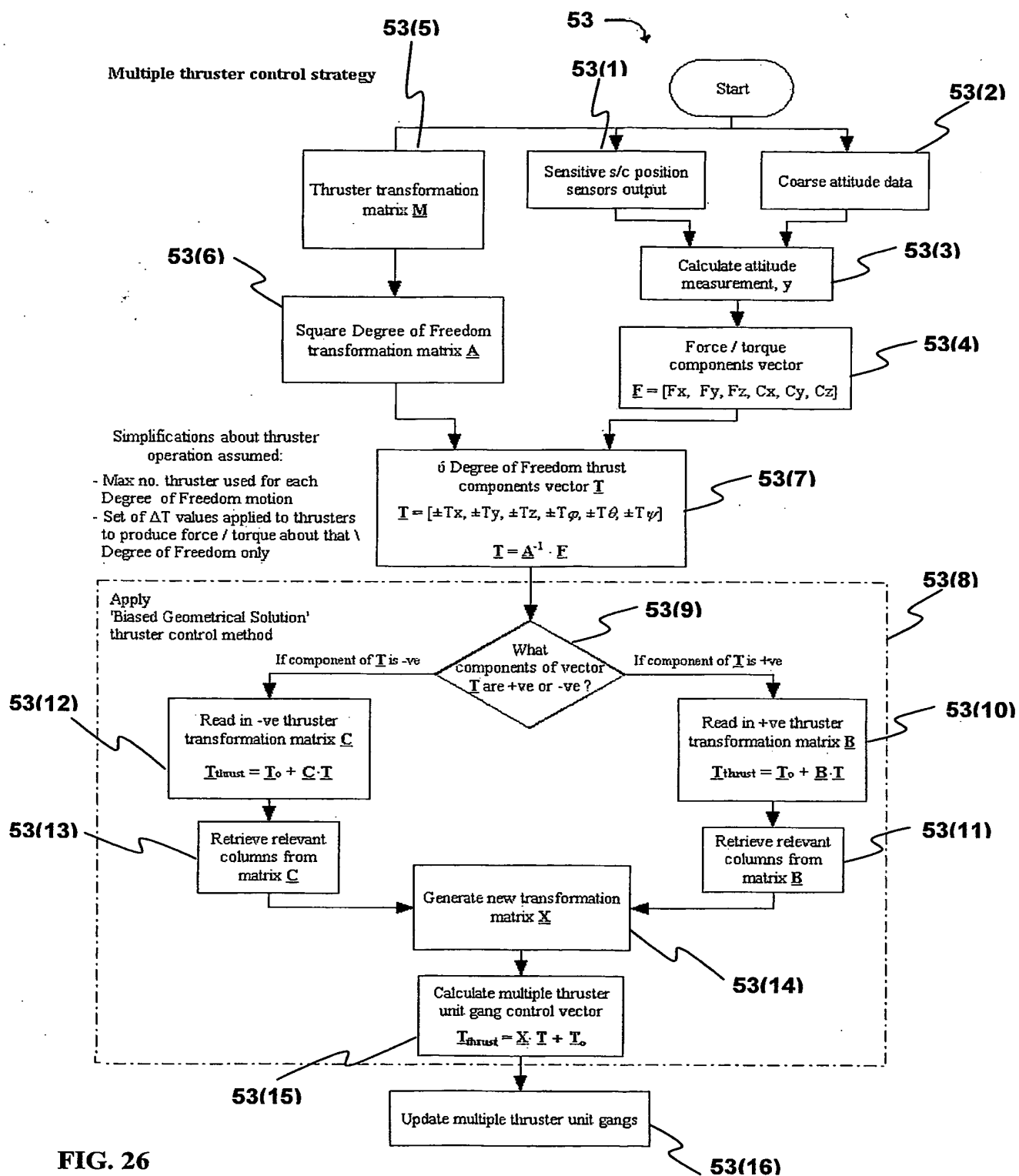
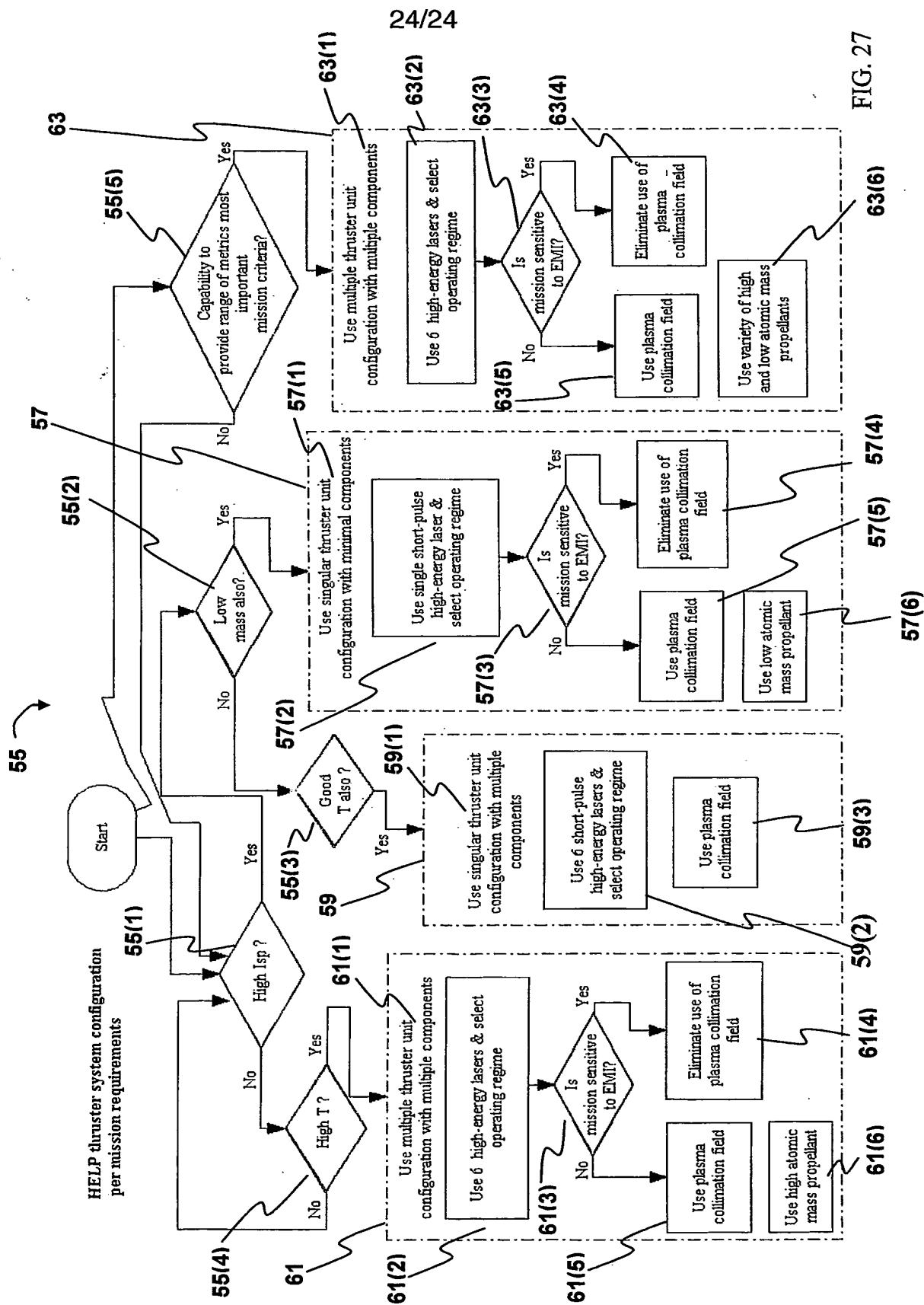


FIG. 26



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